

Psychological counseling and guidance students' views on the relevance of industry 4.0 to educational field

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ABSTRACT

The study aims to reveal the opinions of psychological counseling and guidance students on the importance of an industry 4.0 revolution in education. For this purpose, this study was designed according to the descriptive pattern. The research group formed two hundred and fifty-seven (257) volunteer psychological counseling and guidance students studying at a state university in the Republic of Turkey. The data of the study were obtained by taking into consideration the relevant literature and using three expert opinions. Most of the students assume the use of technology is beneficial in the educational field. However, it was observed that they have insufficient knowledge about the technology applications used in the educational field, and most of the participants assert that they do not know the meaning of Industry 4.0. Besides, 76.7% of the research sample is devoid of technology use in guidance services in schools. In summary, psychological counseling and guidance students associate technology in education with equipment rather than software.

Keywords: Industry 4.0, educational technologies, education 4.0.

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INTRODUCTION

Today's psychological counseling and guidance students who start out as school psychological counselors in the education system may have the right to comment on education as guidance on students' choice of profession and their future in a couple of years (Gysbers, 2001; Kepçeoğlu, 1997; Johnson et al., 2010; Yeşilyaprak, 2012). Additionally, informing and guiding school management, parents and teachers on effective education systems are defined as other duties (Akman, 2002; Kepçeoğlu, 1997; Shek, 2013; Tagay and Sarı, 2012). Their thoughts on the basis and practices of the future's education system affect families, students, school management, and teachers and the software tools used to assist students' choice of profession.

Technological advances that progress swiftly can be predicted to demonstrate that a new era have begun. In fact, the process until today is stated as four periods, the overall technological developments are expressed as

industrial revolution, though. These are: 1) Industry 1.0 revolution, which yielded mechanization; 2) Industry 2.0 revolution, which provided the deployment of automation with the use of electrical energy; 3) Industry 3.0 introduced digitalization; 4) Industry 4.0 revolution, worded as today's intelligent object period (Hermann et al., 2016; Lasi et al., 2014; Mohelska and Sokolova, 2018; Yin et al., 2018; Xu et al., 2017); 5) Industry 5.0 (Society 5.0) unmanned technologies designed for the society (Büyükgöze and Dereli, 2019).

One of the fields affected by the change accompanying the industrial revolution is the education field (Benesova and Tupa, 2017). Every industrial revolution brings its own educational system. Education 1.0 aims at necessities of its society. Education 2.0 aspires to necessities of its industrial society. It asserts that technology is necessary to be learned as a study tool. However, Education 3.0 required education to technology

society. In that period, individual learning was being supported as well. As for Education 4.0, it is the innovative learning period. This period requires top level in lifelong learning, abilities and learning (Gerstein, 2014; Harkins, 2008; Puncreobutr, 2016).

The implication in Industry 4.0 period is that it is a new production period in which the internet is used by everyone, and is related to communication with all living or inanimate things (Aksoy, 2017). If we express it in a different way, it refers to a process where machines - machines, people - people and machines communicate with people. Knowledge creates the power of the new society (Yazıcı and Düzkeya, 2016). It has now become apparent that machines can communicate with each other and even socialize (Öztemel, 2018), and its consequences discussed. Industry 4.0 is thought to mobilize social, economic and political change around the world (Lasi et al., 2014). The educational field is also inevitably affected by the period in which it is experienced as a result of previous industrial revolutions (Toffler, 2018). This process has caused change in educational institutions, and continues to change in the fields of education and the training techniques.

As a result of the industrial revolutions, some areas of specialization have emerged and some professions are eliminated (Benesova and Tupa, 2017). When Industry 4.0 is assessed at this point, it is a process that brings jobs that do not require qualifications to make the machines and specialize in the jobs that require qualification (Şener and Elevation, 2017). As a result of Industry 4.0, new business areas will occur in approximately 20 years (Şener and Elevation, 2017; Yıldız-Aybek, 2017). Basic training is required to specialize in these emerging business areas (Şener and Elevation, 2017). Specifically, a new educational system should include the 21st century skills for students to acquire jobs in the future. Therefore, it is believed in the new education system that the 21st century skills should be gained. 21st century skills include visual education tools, lifelong learning, innovation, entrepreneurship and digital literacy. Additionally, high-level thinking skills are becoming a necessity. Critical thinking, creative thinking, scientific, and analytical thinking are required (Öztemel, 2018). New educational systems must be able to adapt quickly to technology developments (Şener and Elevation, 2017). Only qualified and well-educated people will be able to control the technology produced by this change (Benesova and Tupa, 2017). For this reason, there are some trainings and practices that should be carried out within the training activities. All the features that people should have to adapt to the rapid changes experienced today are called 21st century skills (Anagün, 2016). One of these skills is coding training. It is even a skill that enables the acquisition and development of all skills.

One of the innovations of Education 4.0 as a result of the Industry 4.0 is the coding education. The coding education is defined as "writing a command sequence to

perform a process on a computer system". The coding education is thought to be indispensable for the new education systems (Sayın and Seferoğlu, 2016). It is thought that the coding education is a necessary skill for finding new jobs in the future, as well as contributing to other learning (Sayın and Seferoğlu, 2016). It is acknowledged that computer science has developed students' problem-solving creativity and reasoning skills (Fessakis et al., 2013; Soyka and Kanbul, 2018; Popat and Starkey, 2019). Moreover, learning computer science should be initiated at an early age (Soyka and Kanbul, 2018; Demirer and Sak, 2016). Besides, the belief is that early coding education will develop the ability to design and implement projects in adulthood (Demirer and Sak, 2016).

One of the innovations that the Education 4.0 brings is 3-D printers. Although they were invented in the late 1980s, they were limited in use because of the excessive cost (Canessa et al., 2013). Presently, 3-D technology has become more affordable (Schelly et al., 2015). This has made it accessible in many different areas. One of these areas is the field of education (Canessa et al., 2013). 3-D printer technologies are considered a potential resource for the field of education (Schelly et al., 2015). One of the biggest advantages for education is that hands-on physical models can be affordably created (Horowitz and Schultz, 2014).

With the advent of the Industry 4.0, students use mobile devices to access all kinds of information. At this point, the reading of QR code with mobile devices in teaching is both an alternative to the problem of location (Law and So, 2010), as well as a bridge between the student, teacher and technology (Aktaş and Çaycı, 2013). The QR code information is fast, portable, and can be used in non-school environments (Law and So, 2010). Besides, it also quickly includes additional online resources to be used in education (Aktaş and Çaycı, 2013). Using QR codes in education eliminates the problem of location and time. For these reasons, QR code is accepted as a tool that can be used in education (Law and So, 2010). It is also possible to have fun lessons with QR code applications (Durak et al., 2016).

It is thought that 21st century skills cannot be achieved with the classical education (Akgündüz et al., 2015). STEM (Science, Technology, Engineering, and Mathematics) is thought to be important in gaining these skills. The abbreviation of the "STEM" was first used by the National Science Foundation NSF in 1990 (Sanders, 2009). It is stated that the STEM Education is an education that should be included from kindergarten to 12th grade and perhaps, the most productive time is in the third grade (Uğraş, 2017). STEM is effective in children because the game exists in the applications (Englehart, 2016). It contributes to different areas of education (Kanadlı, 2019) by providing fun learning, requiring group work and focusing on real life events, and incorporating devices that integrate technology (Englehart, 2016).

Industry 4.0 is changing the field of guidance counseling. Today's psychological counseling and guidance students need to be aware of these changes. This research has tried to assess the awareness level of Industry 4.0.

METHODOLOGY

Research model

This study is a descriptive study aiming to reveal the thoughts of psychological counseling and guidance students on the relevance of the Industry 4.0 revolution in educational field. A case, an individual or an object of the research is defined in its own conditions (Kaptan, 1995; Karasar, 2000).

Sample

In 2018 spring semester, the study was conducted on two hundred and fifty-seven (257) psychological counseling and guidance students studying at a state university located in Trabzon province in the Republic of Turkey. The ages of psychological counseling and guidance students participating in the study ranged between 17 and 25 years.

Data collection tools

A questionnaire was developed by the researchers to reveal the ideas of psychological counseling and guidance students on the reflection of the Industrial 4.0 revolution on the educational field. The questionnaire was prepared in accordance with the relevant literature and a questionnaire was prepared with the methods and practices that have just been used in the Education 4.0. This form, prepared by the researchers, has been examined by three academicians specialized in the field. The opinion was taken on whether the form is suitable for the purpose to be used. In this way, the scope is validated. One of the methods that ensure the validity of the scope is to apply to the expert opinion (Bilican-Demir, 2017). For this reason, expert opinion has been applied for the scope validity in the form. In line with the opinions of the experts, necessary corrections have been made on the form. Afterwards, the form was read by the 22 psychological counseling and guidance students and the questions in the form were finalized. The questionnaire includes questions regarding "age", "gender", "use of technology in education", "STEM application", "coding education", "distance education", "software used in education", "Industry 4.0", "three-dimensional printer", "online counseling "IQ code" and "mobile learning". Two questions were repeated in the form and internal validity was attempted.

RESULTS

A total of two hundred and fifty-seven (257) psychological counseling and guidance students were included in the study. The ages of the participating psychological counseling and guidance students ranged from 17 to 24 years. Students who participated in the study were 17 years old (0.4%), 18-year-old (9.3%), 19-year-old (25.4%), 20-year-old (26.7%), 21-year-old (15.9%), 22-year-old (14.2%), 23-year old (5.8%), 24 years old (1.9%) and 25 year old (0.4%). 65.8% of the participants (n=169) were female and 33.5% (n= 86) were male students. Two students (0.8%) did not want to indicate their gender. The participants comprise of 89 (34.9%) freshmen, 79 (30.7%) sophomores, 52 (20.2%) juniors, and 37 (14.5%) seniors.

The psychological counseling and guidance students' thoughts on the use of technology in the field of education

While 94.9% (n = 244) of the students who participated in the study said that they liked to use technology, 5.1% (N = 13) indicated that they did not like to use technology. This finding shows that close to all the participants liked to use technology. While 96.1% (n = 247) of the psychological counseling and guidance students who participated in the research said that technology should be used in education, 3.9% (n = 10) stated that technology should not be used in education. It shows that 2% of those who dislike using technology still think that technology should be used in the field of education. Another finding is that 96.1% of the students (n = 247) think that technology is beneficial and 53.9% (n = 10) think that technology is useless. Some discussion of the use of technology may concern students that robots can negate the need for actual educators, thus the question "Can robots replace teachers?" was included. 28% (N = 72) of the psychological counseling and guidance students who participated in the study stated robots could replace teachers, while 61.1% (N = 157) stated that robots could not replace teachers. At the same time, 10.9% (N = 28) expressed no idea. Based on this finding, we can say that the majority of psychological counseling and guidance students think that robots will not be replaced by teachers in the field of education.

The thoughts of psychological counseling and guidance students about the technologies used in the field of education

As a result of the technologies used in the field of education, the findings obtained to identify information about the realized applications are presented. The question "Do you know what STEM is?" was asked to the participants. 13.6% (N = 35) of the students answered

yes, while 86.4% (N = 222) of them said no. This finding shows that a large majority of psychological counseling and guidance students are unaware of the STEM application. Again, the psychological counseling and guidance students were asked the question "Do you know what coding training is?" 20.2% (n = 52) of the students answered yes; however, 79.8% (n = 205) answered no. This finding suggests that a large majority of psychological counseling and guidance students do not understand the meaning of STEM application.

The next item utilized for the purpose of gaining data about the technologies used in the field of education is "What do you think about the use of three-dimensional printers in education?" While 52.1% of the psychological counseling and guidance students said it was useful to use three-dimensional printers, 46.7% said that they had no idea about three-dimensional printers and 1.2% stated that it was useless to use the three-dimensional printers in education. The outcome reveals that a little more than half of the psychological counseling and guidance students accepted three-dimensional printers as being useful for their educational field, yet almost half of them did not have a thought on it.

Another question that the psychological counseling and guidance students were asked was: "What is your opinion on distance education?" While 25.3% (N = 65) of the students stated that distance education was useful, 52.5% (n = 135) said that distance education was useless and 22.2% (N = 57) of the students stated that they had no idea of distance education. Another question asked the research sample was "Can a cell phone be integrated into classes? The answers to the question are as follows: 47.5% (n = 122) of the psychological counseling and guidance students stated that they can be integrated into the courses, while 35.8% (N = 92) stated that they cannot be integrated into the courses. 16.7% (N = 43) of the psychological counseling and guidance students stated that they had no idea on how to integrate mobile phones into the course. When this finding is evaluated, we can say that nearly half of the psychological counseling and guidance students think that mobile phones will be integrated into the courses, and a little more than half will say that mobile phones cannot be integrated into the courses or that they have no idea of such an application.

To the question "Do you know the software used in the field of education?" 8.2% (N = 21) of the psychological counseling and guidance students answered yes, while 91.8% of the psychological counseling and guidance students (n = 236) stated that they did not know the software used in education.

Psychological counseling and guidance students ' thoughts on the use of technology in the field of counseling and guidance

As 28.8% (N = 74) of the sample considered it to be a

useful application based on the question "What do you think about online counseling? 25.3% (N = 65) considered it to be a useless practice, while 45.9% (N = 118) asserted that they had no thought about it. This finding reveals that the majority of the psychological counseling and guidance students are not familiar with online counseling. Depending on the question "can QI code be used in guidance services in schools?" 12.8% (N = 33) of the psychological counseling and guidance students indicated that it is useful, while 10.5% (N = 27) stated that they cannot be used, and 76.7% (n = 197) stated that they had no idea about the question.

Thoughts of the psychological counseling and guidance students about the Industry 4.0

In relation to the question "Do you know what Industry 4.0 is?" 0.8% (N = 2) of the participants answered yes, 99.2% (N = 255) gave no answer.

DISCUSSION

This study aims to reveal the awareness of psychological counseling and guidance students about the effects of Industry 4.0 on educational practices. According to the findings of this study, almost all (99.2%) of the psychological counseling and guidance students who participated in the research did not know about Industry 4.0. When we think that each industry revolution has an impact on the education system (Benesova et al., 2008), it is expected that students of the faculty of the education will be aware of this process. For this reason, it can be concluded that the psychological counseling and guidance students are not aware of this process even though they have compulsory education history and philosophy of education. It is thought that the psychological counseling and guidance students who are expected to guide teachers, students and parents for better education in educational institutions (Akman, 2002; Kepçeoğlu, 1997, Shek, 2013; Tagay and Sarı, 2012) will also benefit from the information regarding the reflections of Industrial Revolution on the educational field.

The Education 4.0 which emerged as a result of Industry 4.0 revolution indisputably is required for the use of technology in educational applications (Şener and Elevli, 2017). At this point, nearly all of the students who like to use the technology like to use technology and think that technology should be used in the field of education. These results are similar with a research on academicians (Menzi et al., 2012). However, the psychological counseling and guidance students who participated in the study understand the use of technology in education, such as smart board and projection equipment. When these findings are evaluated, it is seen that the necessity of using the technology

required by the training 4.0 is also advantageous, but their knowledge on how technology should be used in education is insufficient. In a different way, according to the findings of this research, almost all psychological counseling and guidance students like to use technology and think that technology should be used in education. Based on these findings, it can be said that the psychological counseling and guidance students are aware that teachers should use technology in education. However, it can be said that their awareness on how to use the technology is insufficient. More than half of the students in the study think that robots cannot replace the teacher in the field of education. In the literature, it is believed that robots can be used as an assistant teacher (Arslan, 2014).

Certain questions were asked about "STEM", the "coding education", the "distance education" and the "three-dimensional printers" to reveal the opinions of the psychological and guidance students about the technologies used in the field of education. The majority of the psychological counseling and guidance students who participated in the study stated that they have no idea about the STEM application. When it is considered that the STEM application will be inevitably included in the educational system in the current and following period (Kanadlı, 2019), it is necessary for the students to understand STEM and its effects. In addition to this, it is inevitable that the psychological counseling and guidance students will have information about this practice considering the opinions that psychology is at the center of the STEM practice (Breckler, 2014).

Another finding of the study is that the majority of the psychological counseling and guidance students do not have an idea of the coding education. It can be seen that the coding education has helped to improve the skills of problem solving and thinking (Fessakis et al., 2013; Soyka and Kanbul, 2018; Popat and Starkey, 2019). For this reason, it is seen that the psychological counseling and guidance students should be aware of the coding education. In addition to this, it is clear that the psychological counseling and guidance students need more information about the coding education when they consider that the coding with the training 4.0 is a means of communication (Aytekin et al., 2018), and a skill that will influence professional selection (Sayın and Seferoğlu, 2016). It is interesting to note that more than half of the students participating in the study found that 3-D printers were useful in the field of education. They can be used in education software, smart board and projection in the form of expressions; the use of technological tools in education shows the use of technology in education. In other words, they consider the use of technology in the field of education as hardware, but their awareness of the effects of the software is quite low.

More than half of the psychological counseling and guidance students who participated in the study indicated that distance learning was inefficient. In fact, considering the flexibility in space and time (Gunawardena and

Mclsaac, 2013), and the contribution to the lifelong learning (Oran and Karadeniz, 2017), it can be said that the psychological counseling and guidance students have low awareness of distance education. Approximately, one fourth of the students who participated in the research stated that they had no idea about the distance education. Only one fourth stated that distance education was beneficial. In the light of these data, it would be helpful to investigate the psychological counseling and guidance students understand from the distance education in another study in that the psychological counseling and guidance student may have perceived the distance education only as a compulsory education.

Another finding of the study is what they think about the online consulting practice. Approximately, half of the psychological counseling and guidance students participating in the study stated that they did not have any idea about this practice, while 25.3% of the students considered it a useless practice, and 28% of the students considered it a useful practice. Based on these findings, it can be concluded that students need to be informed about the online counseling. Another finding shows that there is an idea about the use of "QR code" in the guidance activities. 76.7% of PDR students stated that they had no idea of using "QR code" in the guidance activities. The QR code's application can be thought of as an effective application given its rich content (Aktaş and Çaycı, 2013), and ease of carrying content in non-school environments (Law and So, 2010).

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